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## Control of SO<sub>2</sub> emissions from power plants: A case of induced technological innovation in the U.S.

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### Abstract

This paper investigates how the details of government actions induce innovation—the overlapping activities of invention, adoption and diffusion, and learning by doing—in “environmental technology,” products and processes that either control pollutant emissions or prevent emissions altogether. It applies multiple quantitative and qualitative measures of innovation to a case subject to several “technology-push” and “demand-pull” instruments: sulfur dioxide control technology for power plants. The study employs analyses of public R&D funding, patents, expert interviews, learning curves, conference proceedings, and experience curves. Results indicate that: regulation and the anticipation of regulation stimulate invention; technology-push instruments appear to be less effective at prompting invention than demand-pull instruments; and regulatory stringency focuses inventive activity along certain technology pathways. Increased diffusion of the technology results in significant and predictable operating cost reductions in existing systems, as well as notable efficiency improvements and capital cost reductions in new systems. Government plays an important role in fostering knowledge transfer via technical conferences, as well as affecting the pattern of collaborative relationships within the technical research community via regulatory changes that affect the market for the technology. Finally, the

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